

What is claimed is:

1. A fabrication method of a nano-tube, comprising the step of;  
radiating ions onto said nano-tube; and  
oxidizing said nano-tube.
2. A fabrication method of a nano-tube according to claim 1, wherein, in said ion radiating step, after an element had been ionized, said resultant ions are accelerated by an electric field and thereby radiated onto said nano-tube.
3. A fabrication method of a nano-tube according to claim 1, wherein an element had been reduced into plasma condition and said ions that have been produced in said plasma condition creating process, are radiated onto said nano-tube.
4. A fabrication method of a nano-tube, comprising the steps of;  
heating said nano-tube at a temperature of from 300 to 800 °C; and  
radiating ions onto said nano-tube thus-heated .
5. A fabrication method of a nano-tube, comprising the steps of;  
heating said nano-tube at a temperature of from 300 to 800°C; and  
radiating an atomic state of atoms and ions onto said nano-tube thus-heated, simultaneously.
6. A fabrication method of a nano-tube, comprising the steps of;  
heating said nano-tube at a temperature of from 300 to 800°C; and  
radiating ions onto said nano-tube thus-heated; and  
oxidizing said nano-tube.
7. A fabrication method of a nano-tube, comprising the steps of;  
placing said nano-tube on a glass substrate;  
heating said nano-tube at a temperature of from 300 °C to a temperature lower than a distortion point of said glass substrate;  
radiating ions onto said nano-tube thus-heated; and  
oxidizing said nano-tube.
8. A fabrication method of a nano-tube, comprising the steps of;  
heating said nano-tube at a temperature of from 300 to 800°C;

radiating ions and an atomic state of atoms onto said nano-tube thus-heated, simultaneously; and  
oxidizing said nano-tube.

9. A fabrication method of a nano-tube, comprising the steps of;

placing said nano-tube on a glass substrate;  
heating said nano-tube at a temperature of from 300 °C to a temperature lower than a distortion point of said glass substrate;  
radiating ions and an atomic state of atoms onto said nano-tube thus-heated simultaneously; and  
oxidizing said nano-tube.

10. A fabrication method of a nano-tube, comprising the steps of;

radiating ions onto said nano-tube;  
heating said nano-tube at a temperature of from 300 to 800°C; and  
radiating ions onto said nano-tube thus-heated.

11. A fabrication method of a nano-tube, comprising the steps of;

radiating ions onto said nano-tube;  
heating said nano-tube at a temperature of from 300 to 800°C, and  
radiating ions and an atomic state of atoms onto said nano-tube thus-heated, simultaneously.

12. A fabrication method of a nano-tube according to claim 1, wherein said nano-tube is a carbon nano-tube.

13. A manufacturing method of a field-emission type cold cathode, comprising an emitter containing therein nano-tubes, an insulating layer and gate electrode provided so as to surround said emitter, and an anode electrode provided on said gate electrode to thereby cause an emission of electrons from said emitter by applying a voltage to said emitter, said method comprising the steps of;

introducing a gas onto said emitter;  
applying a voltage to one of said gate electrode, said anode electrode, and a newly provided electrode to thereby cause an emission of said electrons;

ionizing said gas; and

radiating said ions onto said nano-tubes.

14. A manufacturing method of a field-emission type cold cathode, comprising an emitter containing therein nano-tubes, an insulating layer and gate electrode provided so as to surround said emitter, and an anode electrode provided on said gate electrode to thereby cause an emission of electrons from said emitter by applying a voltage to said emitter, said method comprising the steps of;

introducing a gas onto said emitter;

applying a voltage to one of said gate electrode, said anode electrode, and a newly provided electrode to thereby cause an emission of said electrons;

ionizing said gas;

radiating said ions onto said nano-tubes; and

oxidizing said nano-tubes.

15. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 4.

16. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 5.

17. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 10.

18. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 11.

19. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 12.

20. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 13, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 4.

21. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 2.

22. A manufacturing method of a display device, said display device being a

flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 3.

23. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 6.

24. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 7.

25. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 8.

26. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 9.

27. A manufacturing method of a display device, said display device being a flat-surface type, said method comprising the steps of;

utilizing said field emission type cold cathode produced in said manufacturing method according to claim 14, and wherein said nano-tubes contained in said emitter is provided in said fabrication method according to claim 12.

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